



Wayne National Forest

Hazardous Tree Management Plan for Recreation Areas

(November 2003)

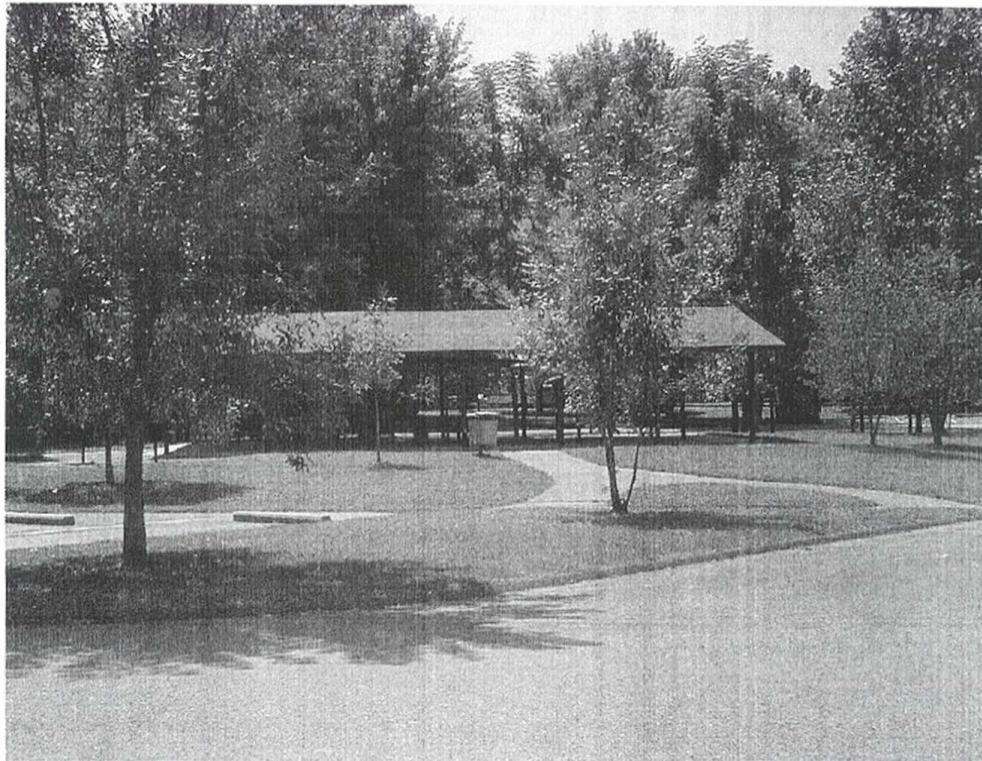


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PURPOSE AND NEED

The purpose of the Hazardous Tree Management Plan (HTMP) is to establish a hazardous tree program (HTP) for the Wayne National Forest (the Forest) and to provide guidance for program implementation to the districts. The need for this plan arises from the responsibility of the Forest to reasonably protect visitors as invitees to recreation areas. A deliberate effort by the Forest to manage for hazardous trees will increase visitor and employee safety, as well as reduce liability by avoiding vulnerability to claims of negligence or breach of duty.

The Wayne's HTMP is a compilation of information drawn from several published and unpublished hard copy and internet based reference guides.

INTRODUCTION

Trees are a natural component the forest landscape. Generally, they are not hazards in and of themselves. However, they may become a hazard when placed among manmade developments with accompanying visitor activities. Although any tree or portion of a tree may present some degree of risk or hazard to visitors, employees, and property simply by its proximity, in most cases, only such trees that are determined to possess a significant flaw or structural defect may be deemed hazardous. Defective trees are not hazard trees unless there is a target. Targets are any structures or areas where people or equipment are likely to congregate and/or stop.

I. Types of Hazardous Tree Conditions

It is not the intent of this section to technically define or characterize all of the various sorts of hazardous tree conditions. Such information can be obtained through training, experience, and references. However, the following list includes many of the most common types of hazardous tree conditions:

Common hazardous tree conditions,,.			
Wind damage	Construction damage	Ice/snow damage	Vehicle damage
Cat face (fire damage)	Lightning	Splits and shakes	Butt rot
Fungi/conks	Root rot	Root exposure	Mechanical root damage
Soil compacted areas	Soil slippage areas	Heavily leaning trees	Dead limbs(overhangs)
Insect infestations	Termites/ants	Weak V-crotches	Tree declines/diseases
Cankers	Weak branch unions	Cavities	Poor tree architecture

PROGRAM OBJECTIVES

The Forest must seek to implement a hazardous tree program that will reasonably protect visitors from unnecessary risks resulting from hazardous trees. The program should be directed toward the public welfare while simultaneously avoiding a posture of negligence. A hazardous tree reduction program provides a systematic method for mitigating tree hazards to avert damage to people or property. The problems should address the areas of visitor use, landscape management, interpretation and transportation corridors (such as trails, trailheads, parking lots, walkways, visitor centers, campsites, picnic grounds, etc.), which the public is openly invited or requested to use. The program is not applied to wild or natural areas away from trails, shelters, or other developed areas.

The inherent decision-making challenge in addressing hazardous trees is to preserve and sustain healthy trees as components, of the forest's natural systems, while treating or removing trees with discernible defects that could pose a hazard to people or property. The attitude when inspecting a

tree must be: *Can this tree be reasonably retained as a vital component of the recreation area? If not, should the tree be removed?* The action to be taken should result from an evaluation of the tree as a functional and aesthetic component of the landscape, in addition to its potential hazard.

There may be situations where particular weather or site conditions can make a group or section of trees in a public activity area hazardous. A system of notification or warnings may be warranted in such cases. Where or when a hazardous condition exists it may be necessary to close an area until the hazardous situation ends or is corrected.

PROGRAM GUIDANCE

The Forest's hazardous tree program is implemented through its hazardous tree management plan (HTMP). The HTMP shall be utilized as an action plan and a component of each district's annual Recreation Operation/Maintenance and Vegetation Management Plan.

1. HTMP Action Items

A. Systematic approach for inspecting recreation areas

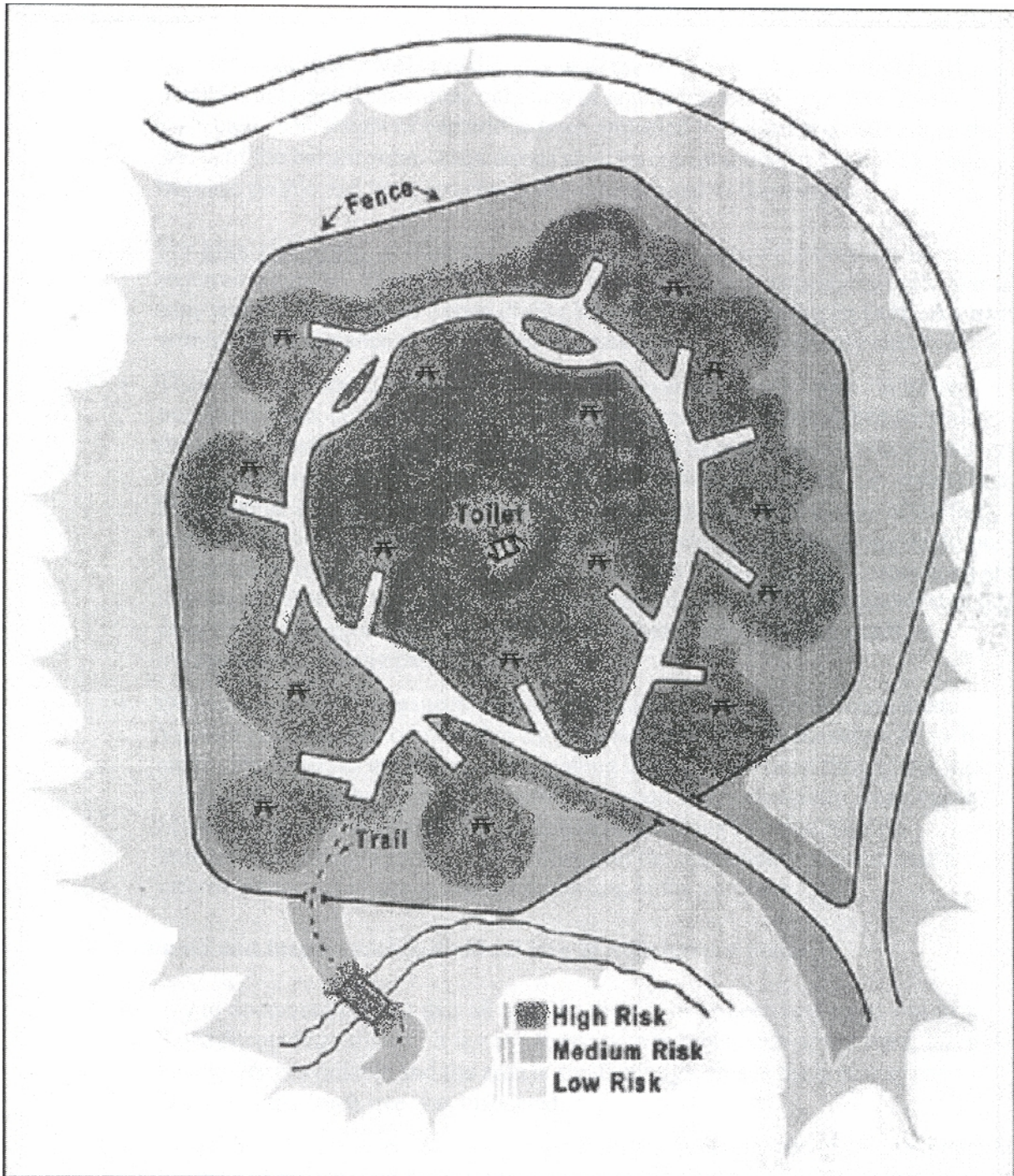
Recreation areas should be divided into hazard risk zones, which determine the intensity of evaluation.

1. Stratify the area into risk zones on a map:

- 1 = High risk areas, such as picnic grounds, campgrounds, restrooms, shelters and other structures, parking lots, trailheads, interpretive signs and kiosks along trails, and any other places where people might congregate.
- 2 = Medium risk areas, such as trails, footpaths within or connected to developed recreation areas, open picnic areas without fixed picnic tables, etc.
- 3 = Low risk areas such as woods, open fields or areas with trees and low foot traffic and no property, as well as roads leading into campgrounds and picnic areas.

Tree Hazard Risk Zones (zone width varies with tree height)	
- High Risk	High use areas with concentrations of people, parked vehicles and permanent structures. Highest priority for regular inspections.
II - Medium Risk	Intermittent use by people and moving vehicles. Priority for inspections commensurate with amount and type of use.
III - Low Risk	No vehicles or structures and low visitor use. Priority for inspections commensurate with amount and type of use.

Figure 1: Sample Drawing of Risk Zones in a Camping Area



2. Examine the trees in high-risk areas systematically, looking at all the trees in these areas.

- Inspection intensity will vary directly with the risk level. All trees within falling distance of targets (structures, vehicles, or concentrated use areas) shall be inspected. The height of hazardous trees projected to the ground determines the width of the hazard zone. Inspections shall be concentrated in High Risk Zones because people and most structures are concentrated in these areas.
 - For high risk areas, at least one inspection prior to opening recreation sites is required annually. Districts may choose to complete two inspections each year if time and funding permits - once during leaf-on and once during leaf-off. All trees within falling distance of designated use space shall be individually checked.
 - There may be hazardous trees even in moderate and low-risk areas. In buffer, transition areas, or perimeter zones, inspections may be accomplished by walk-through procedures. Moderate risk areas should be inspected at least once every two years during leaf-on. However, if the last inspection dictates (i.e. results in a high number of hazard trees in an area or tree(s) that have a high rate of failure), complete an annual inspection in moderate risk areas. Low risk areas could be inspected at longer intervals (i.e. every three years), but scheduled inspections are important. Trees in these areas shall be examined periodically to remove standing dead trees and major dead limbs, especially where they overhang roads, at intersections, or along paths/trails.
 - Ordinarily, scheduled inspections are not required in the general forest area. Visitors are expected to know that they are responsible for their safety in such areas. However, as employees are traveling through the Forest throughout the workweek, be on the lookout for potential hazard trees, especially along roads. Mark, document, and report any potentially hazardous tree that requires immediate corrective action. Also, whenever the opportunity presents itself, inform visitors of inherent risks of recreating in the outdoors.
3. Evaluate and inspect each individual tree in high hazard zones.
- Try to document the fact that all trees on the site have been inspected, not just those deemed hazardous. It is not necessary to number each of the trees, but if the manpower is available and the area is small enough, this is the best way to document that each tree was inspected.
 - Trees shall be inspected in a systematic fashion. When inspecting a tree, begin at the base of the tree and work upwards toward the crown noting all defects. Examine all sides of the tree for hazard indicators and take increment cores of suspect trees. Look carefully at the tree base and exposed roots. After noting any structural defects, step back and consider aspects of the environment that may influence the hazard and note the proximity to any targets. Inexperienced hazard tree inspectors should work in teams of two or more.
 - Some schemes recommend the use of two teams: one to examine all trees on the site to identify hazardous trees, and another (usually the ADR or experienced Rec.

Tech) who examines only the hazardous trees and prescribes treatment. This might be a good interim method when working with inexperienced tree inspection personnel.

4. Promptly implement any corrective actions to be taken.

- In completing the Tree Hazard Evaluation Form (Form #1 — attached), assign a risk rating to each tree (high, medium, or low) and decide on the type and priority of corrective action. Weigh the benefits that a tree is providing against the hazard that it poses, then ask yourself; are the benefits worth the risk? Address high priority hazardous trees first.
- Each district shall have at least one person designated for hazardous tree inspections. All employees should be on the lookout for and report hazardous trees when performing their own duties.

5. Exceptions

- Natural events such as wind or ice storms or wildland fires (for example, the Ironton Ice Storm of 2003) may call for additional special inspections. The decision for additional inspections will be determined by the line officer (Forest Supervisor or District Ranger) on a case-by-case and as needed basis. Line officers should use their best judgment, particularly if there is good cause for more thorough inspections.

B. Methods of inspection

The following methods of inspection may be conducted individually or preferably by a team of at least two persons depending on the nature of the site and the inspector's experience. Plan your route through an area before proceeding with the evaluation.

Individual trees - Each tree in the specified area will receive a 360-degree visual inspection for flaws/defects. This means close visual inspection, including tests with various tools (i.e. boring devices, knives, axes, mallets, etc.) as warranted.

Walk through - Walk through the area visually scanning for potential defects. This includes inspection of individual trees suspected of being hazardous, as above.

Drive-by or windshield survey - This type of survey involves deliberate visual scans at slow vehicle speed followed by inspections of all trees noted or suspected of possessing hazardous characteristics. Despite the practicality of this method of inspection, particularly where long stretches of roadway are involved, the obvious limitations of the effectiveness of this method may not allow it to be very persuasive in a court of law. Only a thorough documentation of findings, if it can establish a professional level of work, will lend any credence to this method.

C. Tools of the trade

Tools are used to enhance the quality of the inspection process. Tools necessary for this activity include binoculars, knives, hand axe, wood chisels, mallets, handsaw, increment borer, diameter tape, compass, 50-foot retractable loggers tape, camera, pen/pencil, notepad, and Hazard Tree Inspection Form (attached).

D. Taking Corrective Actions

The purpose of a hazard tree evaluation is NOT to remove every tree that exhibits defects; rather, the goal is to preserve the greatest number of trees in recreation areas consistent with safety requirements. Removal of too many trees in an area can destroy the aesthetic qualities for which the site was selected, and could also affect stand stability and increase the probability of wind-throw.

Trees requiring corrective action shall be properly marked and documented. Recreation areas that are closed for a season would best be inspected just prior to reopening. Areas are to remain closed or be closed until hazardous tree conditions are eliminated.

Depending on the location of the tree and its integrity, the district may consider leaving the main trunk of the tree for wildlife habitat in areas where wildlife is considered an important element and where ample den or food trees do not exist. This means that a dead tree need not necessarily remain a hazardous tree and that it is possible to convert a hazardous tree into a positive environmental element. Consult the Forest or District Biologist before removing any tree.

Part of the decision-making process must include the extra manpower (time commitment) and cost in topping a tree as opposed to dropping it. Where a structural target exists, removal of the target is another option if the value of the tree exceeds that of the target.

Three items to consider when evaluating hazard trees in an area:

1. Probability of failure: Estimate the likelihood that under critical weather situations or through predictable decline that tree (branch) will fall during the year.
2. Probability of target impact: Analyze the potential that a falling tree or limbs will strike a visitor, a use area, or a structure. Estimate the likelihood (seasonal or otherwise) that a given area will be occupied. This estimate may also be made in terms of percentage of the time the area is occupied (e.g., campsite reservation lists).
3. Estimate of target: Estimate the value of the target when property is involved.

E. Tree Removal

Before cutting a tree down, consider alternatives. The effects of removing a tree are often pronounced. First, it takes many years for a tree to grow and thus replacing that tree will be a long-term process. Secondly, removal of too many trees may lead to increased windthrow in the remaining stand since the stand will be more open and crowns will be newly exposed. And finally, aesthetic qualities of the recreation area may also be adversely affected by the removal of many trees.

When removal is prescribed, the goal should be to minimize damage to adjacent trees. Wounding of surrounding trees is the major cause of future defects. Limbing or topping a tree before felling can reduce damage. When removing felled trees, care must be taken not to wound the trunks or roots of surrounding trees. Trees are especially prone to damage in the spring when the bark is loose. For this reason, the best season for tree pruning and removal is in the winter when the ground is frozen and when trees and their respective pests are dormant.

J. Follow-up

The effectiveness of the hazard tree program needs to be periodically evaluated. Such an evaluation provides inspectors with the feedback they need to increase their proficiency. Inspectors should be on site when hazard trees are removed or pruned. This will allow inspectors to compare their assessment of external indicators and potential hazard to the real evidence of internal defects.

ROLES AND RESPONSIBILITIES

I. Forest Supervisor (FS)

The Forest Supervisor is responsible for providing the Forest with a current policy on hazardous tree management through the development of a Forest Hazard Tree Management Plan and coordinating a Forest hazard tree identification training at least every two years, depending on personnel turnover.

II. District Ranger (DR)

District Rangers are responsible for ensuring district staff effectively implements the Forest's Hazard Tree Management Plan and notifies the Forest Supervisor or his/her recreation staff of any need for change or updating.

III. Assistant District Ranger (ADR)

Assistant District Rangers are responsible for implementing the Forest's Hazard Tree Management Plan as an action plan. The ADR shall assign at least one staff person (or him or herself) with the responsibility to perform, delegate, or contract out the necessary hazard tree inspections and any subsequent corrective actions. The ADR is also responsible for training staff for hazardous tree management. He/she also must assure the adequacy of fulfilling the direction and intent of the HTMP and notify the District Ranger of any need for change or updating.

APPENDICES

- **Hazard Tree Inspection Form (FORM #1)**
- **Instructions on how to use of the Hazard Tree Inspection Form (To be copied on the back of FORM #1)**
- **Hazard Tree Location Sketch Form (FORM #2)**
- **Report of Tree Failure Form (FORM #3)**
- **Tree Strikes You're Out Employee Safety Guide**
- **Glossary**
- **References**

Each column represents one tree)

Campsite unit # or other recreation structures																	
Tree number (you assign)																	
Tree species (codes on back)																	
DBH (inches)																	
Tree Mapping (if used): tree azimuth (degrees),																	
Tree distance (feet), & refer. point (codes on back)																	
	oL	Targets															
	2	People, Structures, Vehicles															
	1	Trails and Roads															
		Wounds/cankers > 50% of circumference															
		Unnatural lean (unsound root flare or exposed roots esp. with > 35% lean)															
		Root disease															
		Exposed roots with decay, >50% of roots															
		Crack severe (appears fresh or active with no evidence of callous tissue sealing or closing crack) or cracks associated with fork															
		Fruiting of decay fungus or punk knots															
		Sound shell < 33% radius															
		Dead tree, Top/Branch > 9" in diameter															
		Tree or branch may fail before next the scheduled inspection or within one year.															
	ti	Wounds/cankers 33-50% of circum.															
		Exposed roots with decay, <50% of roots															
	y	Cavities in branch, bole, base															
	iJ	2 Codominant stems with included bark															
		Dead Top/Branch, 6-9" in diameter															
		Sound shell 33-60% radius															
		Tree or branch may fail within 1-2 years															
		Wounds/cankers 10-33% of circum.															
		Lightning scar, small crack (crack does not interfere with the tree's structural integrity)															
	1	Large witch broom, dead top/branch 3-6" dia.															
		Codominant stems with no included bark															
		Exposed or severed roots, no decay															
		Natural lean															
		Tree or branch may fail within 2-3 years															
	0	No visible defect; minor wounds, pitch/flux															
		Drilling (if done) -- inches of sound wood															
		Hazard Rating (Target x Worst Defect)															

Use of the Hazard Tree Inspection Form

The hazard tree inspection form is more than a hazard rating record. It is a record of the overall structural condition of a tree that can be used to determine progression of defects over time and to document the frequency of certain defects. All defects observed shall be checked even though only the highest values are used in the hazard rating.

Forms cannot take all situations into account. Trained and experienced inspection crews may need to exercise judgment in some cases. However, if you need to regularly override the form, need training, or have any questions about the process or tree hazard, please contact the Forest Recreation Program Manager.

Trees are easily and accurately mapped on the hazard tree inspection form by selecting reference points, then recording azimuths and distances to all defective trees on the form. Choose reference points that are permanent structures and unlikely to be moved. For large structures, use a more specific reference point such as the most northern/northwestern edge of the structure. Good reference points to use are: permanent picnic tables (codes as "T"), fire pits or grills ("F"), campsite number sign ("H"), latrines ("L"), signs ("S"), benches ("B"), water spigots ("W"), and garbage containers ("G").

List of Tree species codes/abbreviations:

Codes	Tree Species	Codes	Tree Species	Codes	Tree Species	Codes	Tree Species
Ha	Hackberry	dw	Dogwood	ac	American./Slippery elm	sp	Shortleaf pine
wa	White ash	bo	Black oak	et	Cucumber tree	wp	White pine
bb	Black birch	bjo	Blackjack oak	hi	Hickories	vp	Virginia pine
bd	Basswood	P ^o	Post oak	id	Ironwood	yp	Yellow poplar
ab	American beech	ro	Red oak	bl	Black/honey locust	er	Eastern redbud
bg	Black gum	sro	Southern red oak	sg	Sweetgum	sa	Sassafras
be	Black cherry*	so	Scarlet oak	hm	Sugar (hard) maple	sm	Silver maple*
rc	Eastern red cedar	wo	White oak	rm	Red maple	bw	Black walnut
he	Boxelder	yb	Yellow buckeye	as	American sycamore	eh	Eastern hemlock

* Be certain to give special consideration to these tree species because of the weak and brittle nature of their

3. Potential hazard of a tree is determined by Target and Defect:

	Definition	Values
Target	Target rating is a combination of the likelihood that a potential target will be hit (assuming the tree fails) and the value of the target.	Potential targets are assigned values of 1 or 2.
Defect	A defect rating is an estimation of the likelihood that a tree will fail (i.e. before next scheduled inspection) based on available indicators.	Defects are assigned values of 0-3.

- More than one type of potential target or defect may be identified and checked for any tree.
- Calculate hazard rating by multiplying target value plus the value of the worst defect.

Possible Hazard Ratings: Target x Worst Defect = Hazard Rating

6 = Highest, 5, 4, 3, 2, 1, and 0 = lowest

6. Rating Hazardous Condition Recommended Action

Rating Value	Risk of Visitor Injury or Property Damage	Corrective Action
0	None	No immediate action needed
1-2	Low	Identify, document, and continue to monitor annually.
3-4	Medium	Treat the defect or protect/move the target and document action taken.
5-6	High	Take immediate action to remove or prune the hazard tree or defective limb(s), move the target, or close the site.

Name of site: _____

Report by: _____

Date: _____

District unit: _____

A) Tree or Stand

Tree species _____

Approx. dbh _____

Forest type _____

Elevation _____

Stand age class

Overmature

Mature

Young-growth

All-age **Class of****mechanical failure**

Upper bole (top half)

Lower bole

Butt (lower 6 feet)

Limb

Soil (roots pull out of soil)

Root failure (major roots fail)

Defect or fault leading to failure

Rot (trunk, limb or root)

____ Sweep

____ Tree dead - snag

Fire wound

Lightning wound

____ Mechanical wound Leaning

Cracks or splits

Fork or multiple top

Twin bole or basal fork Dead top or branch

Widow-maker or hang-up Canker, rust

Canker, mistletoe Other _____

Unknown or none

Contributing factors

____ Wind Stream bank erosion

____ Snow Shallow rooting

Erosion _____ Tree striking tree

Soil Other: _____

saturation _____ Unknown or none

E) **Time and place of incident** Approx.

hour

Date or month, year _____

During season of public use: Yes No

F) Site category

____ Developed campground

____ Developed picnic ground

____ Other developed public-use site

____ Marked trail

____ Roadside

____ Residence

____ Other _____

G) Property or person affected

____ Agency Contractor

____ Recreationist _____ Public utility

____ Permittee/Concessionaire

____ Other _____

H) Consequences

____ Damaged property: _____

Loss estimate: \$ _____

I) Actions Taken

____ Removal, if so date removed

____ By FS By contractor

By volunteer _____ Other

Estimated cost of removal

Monitor

Other actions taken:

Comments:

Use of the Report of Tree/Branch Failure Form

The Tree/Branch Failure Form (Form #3) is to be used to document the discovery of a fallen tree or large branch (6 inches in diameter or greater) within a recreation area, parking area, administrative area, road, or designated trail. The objective is to encourage districts to record incidents of tree/branch failure, to take prompt action to resolve the situation, and to alert district personnel of the defects that may lead to future tree failure.

Trained and experienced inspection crews may need to exercise judgment in some cases. However, if you need to regularly override the form, need training, or have any questions about the process or tree hazard, please contact the Forest Recreation Program Manager.

Tree Strikes You're Out

Employee Hazard Tree Safety Guide

Introduction

Snags are dead or dying standing trees. Hazard trees can be dead, dying or green trees that are unstable. Over the years many people who have worked in the wood have been killed or injured in accidents involving hazard trees. This guide was developed by the Plumas National Forest to help educate employees and increase their awareness about the dangers of hazard trees and how to work safely in the outdoors. It has been modified to better address the situations and needs on the Wayne N.F. The information in this guide will help employees:

1. Recognize indicators that will identify hazard trees.
2. Identify what work situations could put employees in danger (Watch-Out Situations)
3. Apply appropriate safety guidelines.

Hazard Tree Indicators

- Numerous down trees.
- Leaning trees.
- Dead or broken tops and/or limbs hanging in the trees.
- Absences of needles, bark, or limbs.
- Possibility of rot indicated by conks, broken tops, basal scars, cat faces, numerous down limbs, ants, termites, and/or abundance of woodpecker holes.
- Presence of fungal fruiting bodies on trees (i.e. conks).
- Fire scars (cat faces)

Watch Out Situations

- Snags are falling or have fallen in work area.
- The area is occupied by trees that are susceptible to prune themselves or easily damage by wind (i.e. silver maple)
- Working or taking a break in an identified hazard area or hazard tree.
- Working in hazard tree area during windy or potentially windy situations.
- Working in an area with trees that have been burning for an extended period.
- Tailgate safety session did not include discussion of snags.
- Lookouts are not posted or do not have communications in a hazard tree area.
- Becoming complacent in a hazard tree area.
- Too many snags for posted lookouts to keep track of.
- Parking in hazard tree area.
- Working around heavy equipment or tree felling operation in a hazard tree area.
- Steep slope with hazard trees above you.

Safety Guidelines

- Assess snag hazards before parking, working, or taking breaks.
- Employees must wear hard hats when working in hazard tree zones.
- Use every day examples to brief and train employees about what tree hazards look like.
- Use extra precaution or consider suspending operations during windy conditions.
- Scout area for hazard trees before working/parking in it.
- Identify tree species in an area that are susceptible to wind and insect damage.
- Scout for hazard trees and visibly mark or flag individual and groups of trees that are in or near work areas.
- When possible, post lookouts in areas of known or potential tree hazards.
- When possible, use work tactics that avoid or minimize employees' exposure to tree hazards.
- All employees have the responsibility to speak out when they identify potential tree hazards.
- Discuss and plan escape route and safety zone considering vegetation and terrain.
- Assess the height of treetops when planning safety zone and escape routes.
- Use extra caution when down hill of hazard trees. It is more common for trees and debris to go down hill.
- When escaping the path of a falling tree, do not turn your back - Watch the tree as you move out of its way to ensure you can see any change in its fall or roll caused by contact, breakage, etc.
- Determine if the benefit is worth the risk.

Snag Safety

Size up tree hazards in work area. Never become complacent. Always look up.
Get weather reports.

Scout out parking, work areas, and safety zones.
Advise co-workers of known hazards.
Face your hazard and take appropriate action.
Examine work area for other hazards.
Take extra caution around heavy equipment.
You are ultimately responsible for your own safety.

GLOSSARY

Defects: Injury or disease that seriously weakens the stems, roots, or branches of trees, predisposing them to fail. Defects also include structural problems arising from poor tree architecture, including V-shaped crotches in stems and branches that lead to weak unions, shallow rooting habits, inherently brittle wood, etc.

Hazard Tree: A standing tree, either live or dead, having defects, singly or combined, in roots, butt, bole, or limb, which predispose it to mechanical failure in whole, or in part, and which is so located that such failure has a probability of injury to persons or damage to property – *Peter Gaidula, CA Dept. of Parks and Recreation*. Basically, a tree with a significant flaw/defect which, when coupled with a location in an identified public use area, makes that tree an actual risk to people or property.

Invitee: A Forest visitor or employee who, in effect, enters the recreation area by expressed or implied invitation. As the steward of the land, the Forest is obliged to exercise reasonable care for the safety of invitees during their visit.

Negligence: The failure to take responsible action to adequately protect visitors. Liability for damages from hazardous trees commonly revolves around the determination of whether the Forest was negligent in its programmatic approach to managing hazardous trees. There are four elements, which together constitute negligence:

1. There must be a legal duty or obligation requiring the agency to conform to a standard of conduct to protect the visitor against unreasonable risks. The responsibility of the agency to the visitor may generally be defined as using ordinary and reasonable care to keep the premises reasonably safe for his visit and to warn him of any hidden danger" (Smith V. U.S., 1974).
2. There must be a failure (breach of duty) to meet the standard.
3. There must be an establishable connection between the action (or inaction) and the resulting injury or damage.
4. There must be a definable injury or damage level.

Target: The object, structure, or person that potentially may be hit or impacted by a falling tree or tree part.

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